

Translation

## PATENT COOPERATION TREATY



## PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY  
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference  SFX-PCT-5	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No.  PCT/JP2003/008332	International filing date (day/month/year)  30 June 2003 (30.06.2003)	Priority date (day/month/year)  05 July 2002 (05.07.2002)	
International Patent Classification (IPC) or national classification and IPC  B29C 45/00			
Applicant  SUZUKA FUJI XEROX CO., LTD.			

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

a.  (*sent to the applicant and to the International Bureau*) a total of 7 sheets, as follows:

- sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
- sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

b.  (*sent to the International Bureau only*) a total of (indicate type and number of electronic carrier(s)) \_\_\_\_\_, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

- Box No. I Basis of the report
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

Date of submission of the demand  29 January 2004 (29.01.2004)	Date of completion of this report  19 May 2004 (19.05.2004)
Name and mailing address of the IPEA/JP	Authorized officer
Facsimile No.	Telephone No.

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/JP2003/008332

## Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

This report is based on translations from the original language into the following language \_\_\_\_\_, which is language of a translation furnished for the purpose of:

international search (under Rules 12.3 and 23.1(b))  
 publication of the international application (under Rule 12.4)  
 international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

The international application as originally filed/furnished

the description:

pages \_\_\_\_\_ 1-31 \_\_\_\_\_, as originally filed/furnished

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

the claims:

pages \_\_\_\_\_ 5-8, 12 \_\_\_\_\_, as originally filed/furnished

pages\* \_\_\_\_\_, as amended (together with any statement) under Article 19

pages\* \_\_\_\_\_ received by this Authority on 07 May 2004 (07.05.2004)

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

the drawings:

pages \_\_\_\_\_ 1-7 \_\_\_\_\_, as originally filed/furnished

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3.  The amendments have resulted in the cancellation of:

the description, pages \_\_\_\_\_  
 the claims, Nos. \_\_\_\_\_  
 the drawings, sheets/figs \_\_\_\_\_  
 the sequence listing (*specify*): \_\_\_\_\_  
 any table(s) related to sequence listing (*specify*): \_\_\_\_\_

4.  This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

the description, pages \_\_\_\_\_  
 the claims, Nos. \_\_\_\_\_  
 the drawings, sheets/figs \_\_\_\_\_  
 the sequence listing (*specify*): \_\_\_\_\_  
 any table(s) related to sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/JP03/08332

**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. Statement****Novelty (N)**

Claims \_\_\_\_\_ 1-12 YES

Claims \_\_\_\_\_ NO

**Inventive step (IS)**

Claims \_\_\_\_\_ YES

Claims \_\_\_\_\_ NO

**Industrial applicability (IA)**

Claims \_\_\_\_\_ 1-12 YES

Claims \_\_\_\_\_ NO

**2. Citations and explanations (Rule 70.7)****List of documents**

Document 1: US, 4923666, A (Cinpres Ltd.), 8 May, 1990 (08.05.90), column 3, lines 30-37; column 3, line 66 to column 4, line 15; claim 1, & JP, 63-268611, A, claim 1, page 2, lower left column, lines 4-7, page 3, upper right column, lines 3-7 and lower left column, line 6 to lower right column, line 4

Document 2: US, 5540581, A (Nippon Steel Chemical Co., Ltd.), 30 July, 1996 (30.07.96), column 6, lines 55-63, claim 1, & JP, 5-16177, A, claim 1 [0016]

Document 3: US, 5049327, A (Sumitomo Heavy Industries, Ltd.), 17 September, 1991 (17.09.91), column 3, lines 31-35, claim 1, & JP, 64-24715, A, claim 1, page 4, upper right column, lines 14-20

**Comparison and judgment****Claims 1 and 3**

Document 1 describes (1) that resin is filled into a cavity, then pressurized gas is injected, and a molded product of synthesized resin is cooled for solidification in the mold under gas pressure, (2) that the invention aims to provide a method for manufacturing products precisely formed without shrink marks or warps on the surfaces, and (3) that the reduction of the volume of a molded product caused by the volume shrinkage that occurs as the melted resin cools is compensated for because of the pressure of gas fluid, and the molded product is kept in the form along the cavity; and the said document shows examples of ABS resin, polycarbonate resin, denatured polyphenylene ether resin, etc.

Document 2 describes that pressure gas acts on melted resin injected and filled in a cavity for thick wall parts where shrink marks are formed in order to prevent such marks on the product, and enumerates ABS, polycarbonate, etc., as such resin.

The inventions described in documents 1 and 2 are that fluid pressurized above atmospheric pressure is injected into melted resin and also that the shrinkage in molding of a molded resin product is reduced. Generally, in making a die, its cavity is made somewhat larger to allow for the shrinkage that occurs in molding; on the other hand, for dies applied for the inventions described in documents 1 and 2 that reduce the shrinkage in molding, it is clear that the occurrence of such shrinkage does not require much consideration, and so it can be understood that the rate of shrinkage in molding is naturally set extremely low. A person skilled in the art could therefore have specified such a value in a range of 4.5/1000 – 6.6/1000 as required. The inventions described in documents 1 and 2 aim to reduce the shrinkage of a molded resin product, and so the differences between the shrinkage rates in the XYZ directions are very small and adopting the same shrinkage rate for those directions without regard to such differences would be merely a matter of design variation.

For the temperatures in molding resin, they are merely a matter to be decided as required based on the type of resin, etc.

## Supplemental Box

In case the space in any of the preceding boxes is not sufficient.  
Continuation of: V.2

As supplementary discussion to the consideration on the use of the same shrinkage rate, the specification (page 19) describes that, "although, in an actual injection molding process,...there occur differences in the shrinkage rate in molding because of different shapes of products, different die temperatures, different thermal conductivities, etc., a die is designed with the same shrinkage rate in molding used for the length, width and height in the creation of it. Setting respective different shrinkage rates for the XYZ directions is permissible, but poses a problem of more complicated design and making of the die." It can therefore be understood that the present application chooses the "simplification of design and making of dies" in the balance between the "required precision of molding" and the "simplification of design and making of dies" that a person skilled in the art would normally take into consideration. Such consideration and choosing would be common daily work for a person skilled in the art.

## Claims 2, 4 and 5

The inventions described in documents 1 and 2 are applicable to thermoplastic resins, such as ABS and polycarbonate chosen, as required, and a resin to be used could be decided by a person skilled in the art as required based on the physical properties to be given the product. Accordingly, a person skilled in the art could have easily adopted well-known thermoplastic resins or their mixtures as required, and checked the effects of them. In addition, it is not considered that specifying the resins and their mixtures described in claims 2, 4 and 5 would produce a significant effect that a person skilled in the art could not have easily conceived of.

## Claims 6-8

The point through which gas is injected could be simply decided by deciding the gate position based on the shape of a molded product, etc., and then choosing the best of well-known gas injection means based on the relationship between the gate position and the position of gas injection. Furthermore, the methods of gas injection described in claims 6-8 are hardly novel.

## Claims 9-11

Document 3 describes the molding with differences in foaming reaction caused by different cooling rates of melted resin to prevent the production of shrink marks on the surface of a molded product.

Although document 3 does not describe the type of resin used, the amount of a foaming agent added, the temperature of resin in molding, and the shrinkage rate to be taken into consideration in designing dies, a person skilled in the art could have easily thought (1) that any resin capable of foaming could be used as required, (2) that the amount of a foaming agent added could be decided as required within a range that shrink marks would not be produced, (3) that the molding temperature could be decided as required based on the type of resin and the shape of a molded product, and (4) that, because the invention of document 3 aims to prevent the production of shrink marks, it is hardly necessary to take the shrinkage rate into consideration for dies used in that invention.

Accordingly, the subject matters of claims 9-11 would merely involve optimization in the working of the invention described in document 3, normally performed by a person skilled in the art.

## Claim 12

Using recycled materials at appropriate amounts mixed with a molded material is well known.